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(54) **COUPLER FOR FLUIDICALLY COMMUNICATING A HOSE WITH A TRENCH DRAIN**

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E03F 5/04	(2006.01)
E03F 3/04	(2006.01)
E02B 11/00	(2006.01)

(52) **U.S. Cl.**

CPC ***E03F 5/0402*** (2013.01); ***E03F 3/046*** (2013.01); *E01C 11/22* (2013.01); *E02B 11/005* (2013.01); *E03F 5/04* (2013.01)

(58) **Field of Classification Search**

CPC E02B 11/005; E03F 5/04; E01C 11/22

USPC 405/39–45, 47–49; 404/2–5

See application file for complete search history.

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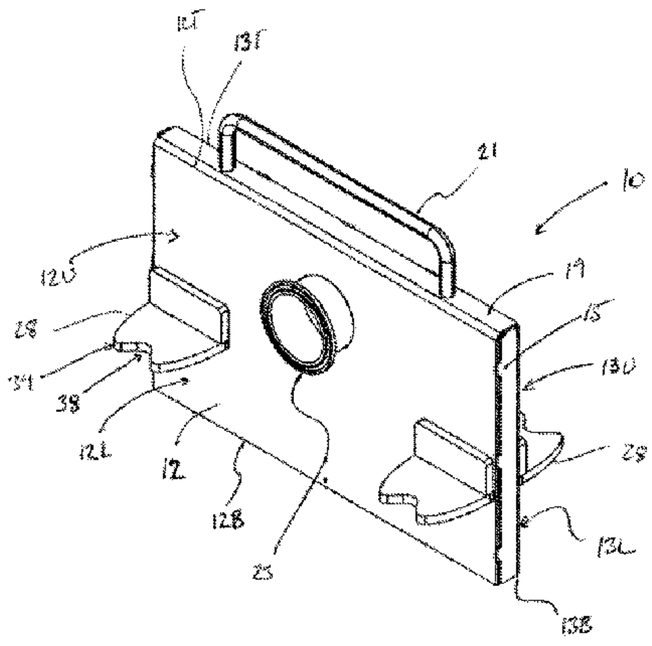
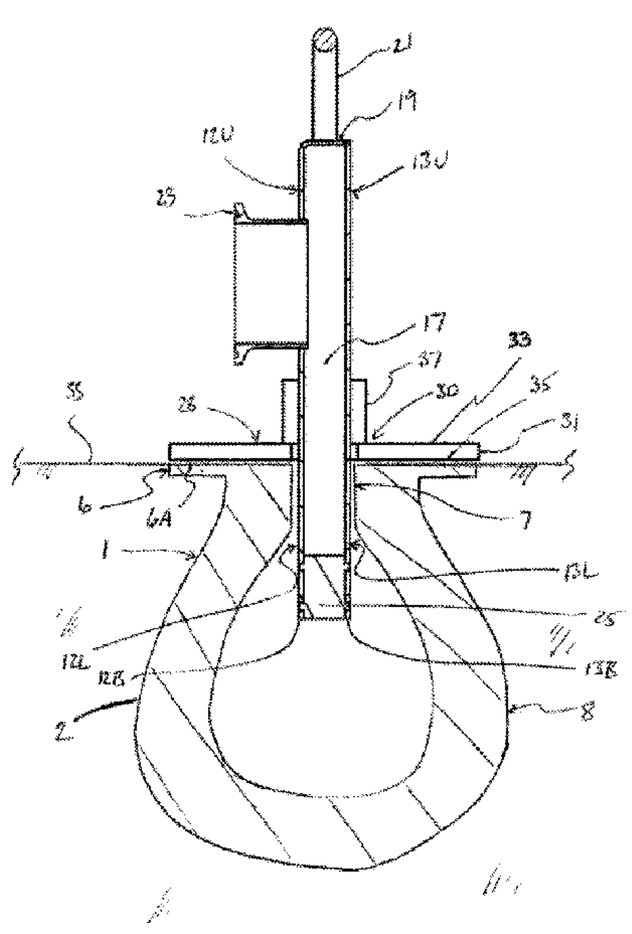
(57) **ABSTRACT**

A fluidic coupler for fluidically communicating a hose with a trench drain in a support surface comprises a series of walls arranged to form a cavity and arranged for insertion into the trench drain, and a hose coupler supported on one of the walls for fluidically connecting a hose so that liquid discharged therefrom is released into the cavity. The cavity is open at the bottom of the fluidic coupler so as to release the liquid to the trench drain. The fluidic coupler includes stabilizing feet supported on opposite walls which are parallel to sidewalls of the trench drain. The feet include a pair of distinct feet located at spaced positions on a carrying one of the opposite walls, and on either side of the hose coupler.

10 Claims, 4 Drawing Sheets





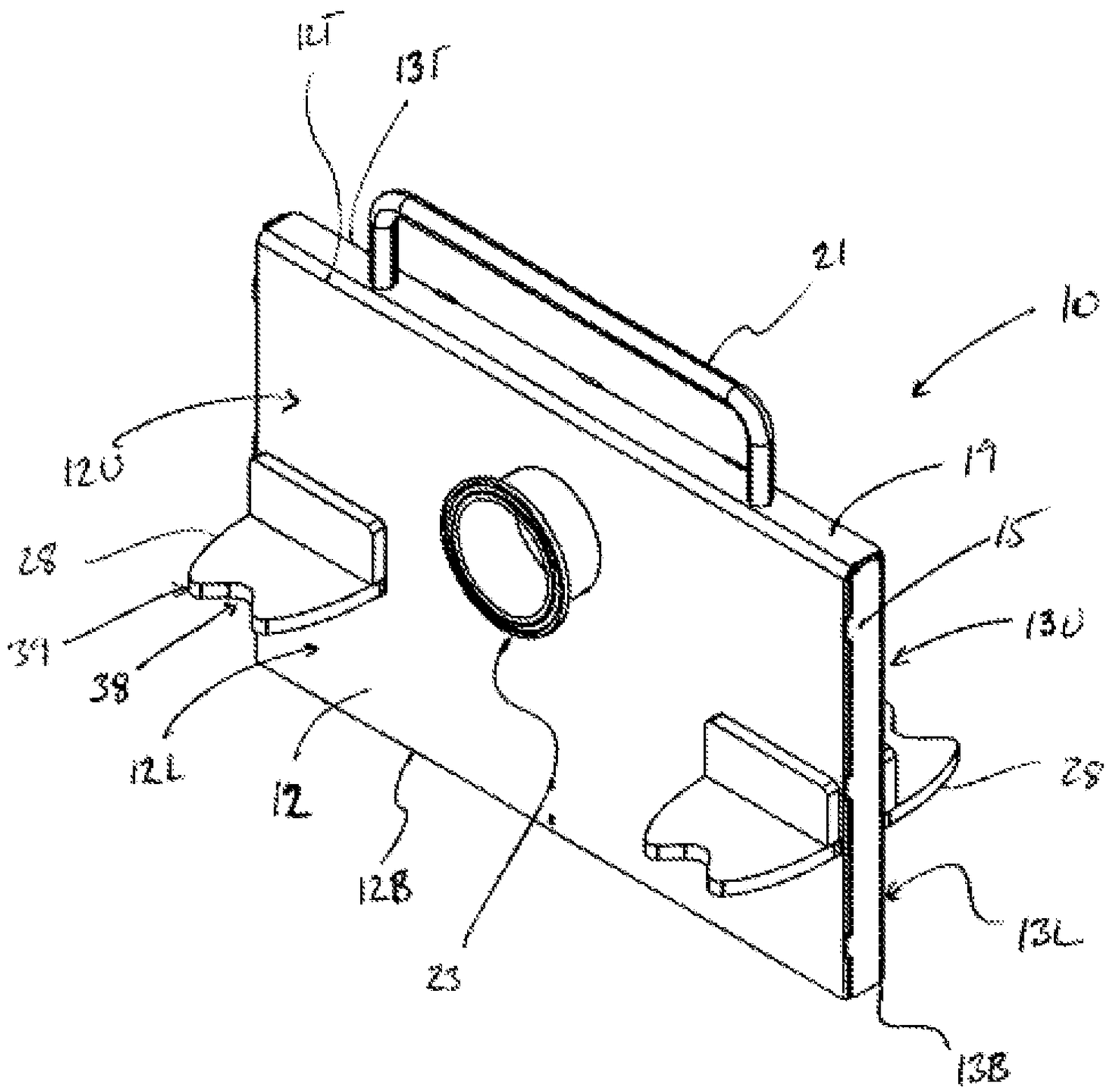


FIG. 1

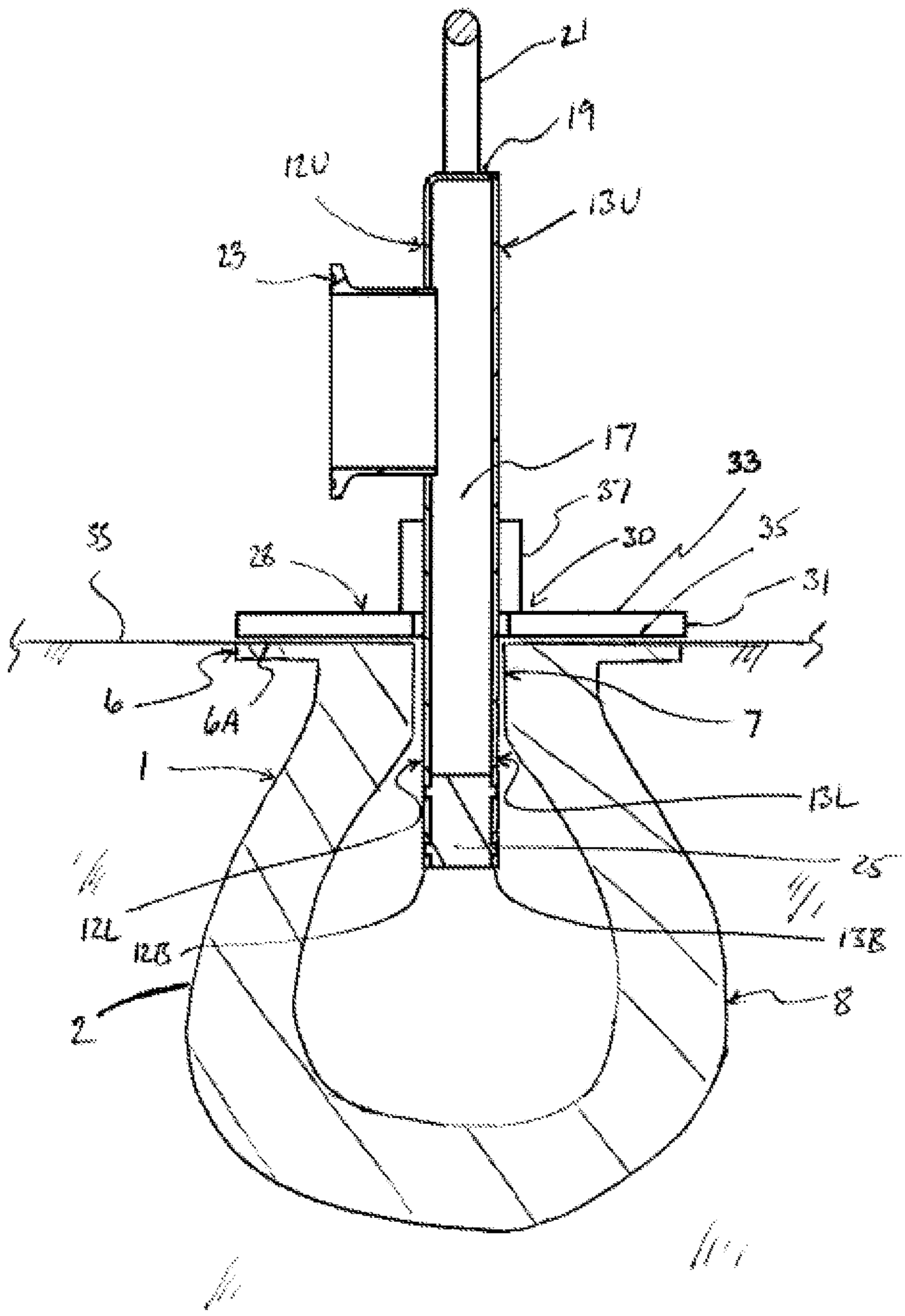


FIG. 2

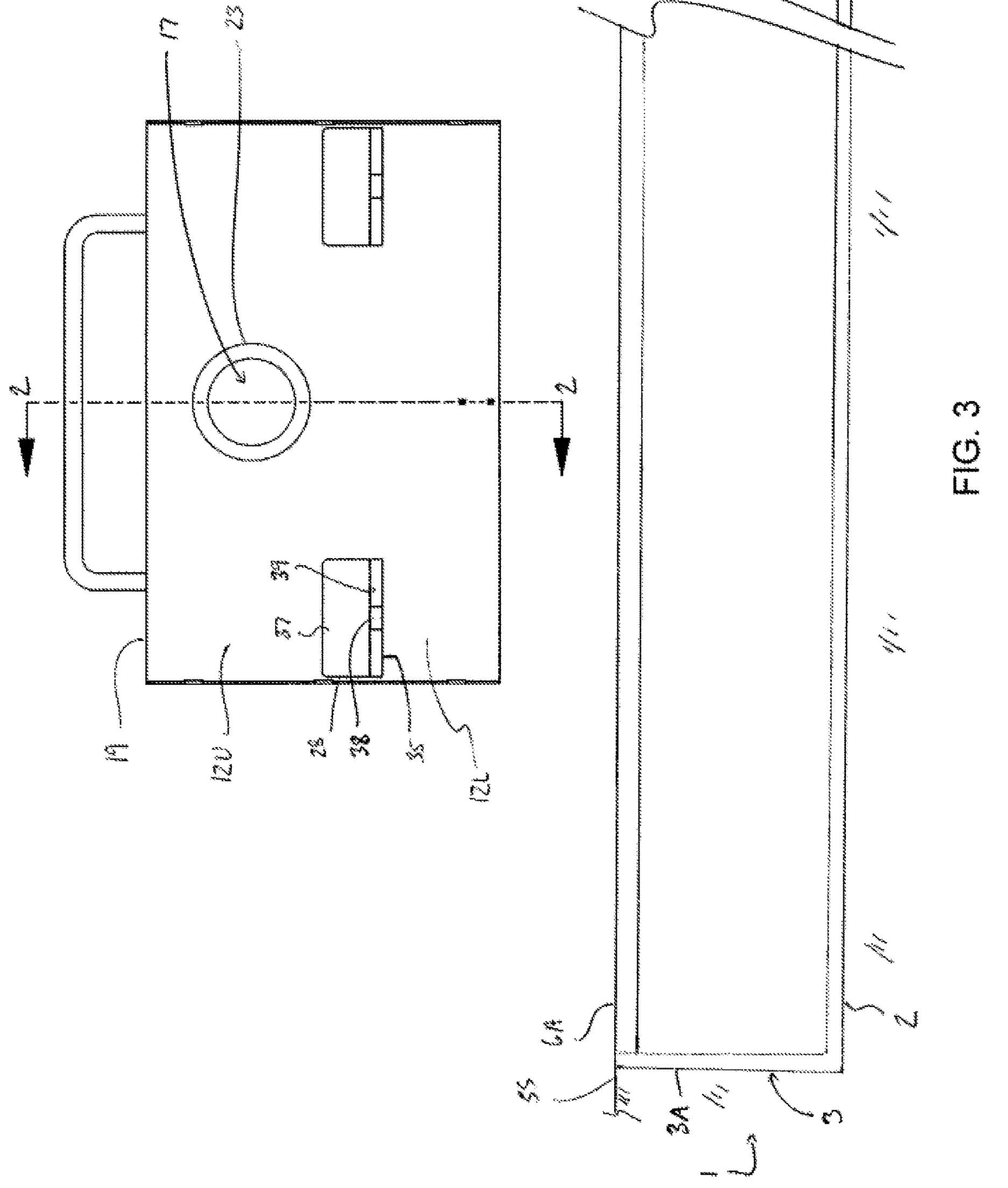


FIG. 3

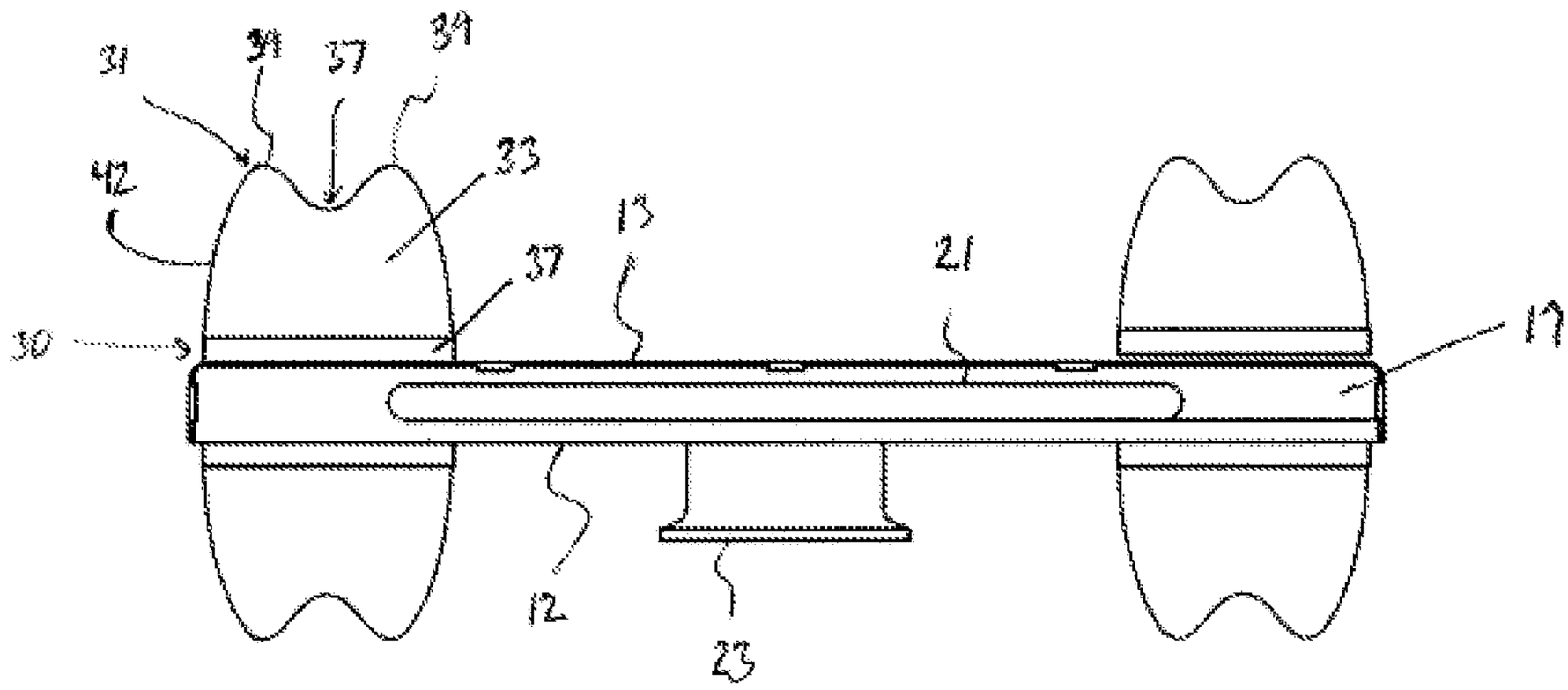


FIG. 4

COUPLER FOR FLUIDICALLY COMMUNICATING A HOSE WITH A TRENCH DRAIN

This application claims the benefit under 35 U.S.C. 119(e) of U.S. Provisional Application Ser. No. 63/184,529 filed May 5, 2021.

FIELD OF THE INVENTION

The present invention relates to a coupler for interconnecting a hose and a trench drain in a support surface which stands upwardly from the trench drain when fluidically coupled therewith.

BACKGROUND

In, for example, a distillery, brewery or winery, it is common to drain liquids from vessels onto a floor for subsequent gravity drainage along the floor to a drain therein that carries the liquid to waste or a collection basin. However, this process is clearly messy.

SUMMARY OF THE INVENTION

According to an aspect of the invention there is provided a coupler for fluidically communicating a hose with a trench drain in a support surface, the coupler comprising:

front and rear walls supported in upstanding generally-parallel spaced-apart condition, wherein the front and rear walls have upper portions defining tops thereof, lower portions defining bottoms thereof opposite to said tops, and laterally opposite sides spanning from the tops to the bottoms of the front and rear walls;

wherein the lower portions of the front and rear walls are configured for removable insertion into the trench drain in a working configuration of the fluidic coupler such that, in the working configuration, the upper portions of the front and rear walls are located externally of the trench drain;

a pair of side walls connected to the front and rear walls in spaced-apart condition and spanning between the front and rear walls to define a cavity therebetween;

a hose coupler supported on the upper portion of the front wall in fluidic communication with the cavity, and configured for fluidic coupling with the hose, so as to pass liquid from the hose to the cavity;

wherein the cavity is open at the bottoms of the front and rear walls for fluidic communication with the trench drain in the working configuration so as to release the liquid received from the hose to the trench drain; and

a plurality of feet carried on the front and rear walls at spaced heights above the bottoms thereof and configured for resting on a top of the trench drain in the working configuration so as to support the hose coupler above the trench drain;

wherein the feet include a pair of distinct feet carried on one of the front and rear walls, defining a carrier wall, in laterally spaced-apart relation on either side of the hose coupler.

This arrangement provides a stably supported fluidic coupler for receiving liquid from a hose and guiding the same to the trench drain.

Typically, the trench drain comprises a channel embedded in support material forming the support surface and the channel extends longitudinally from one end, which may be closed, to a longitudinally opposite end of the channel, which may be in fluidic communication with a collection basin configured to collect liquid. Typically, the lower portions of the front and rear walls are configured for sliding movement along the channel.

Preferably, at least one of the distinct feet has a cut-out in a distal end thereof, which is opposite to the carrier wall, to form a plurality of toes.

Preferably, the pair of distinct feet are located at the sides of the carrier wall.

Preferably, at least one of the distinct feet comprises a drain-engaging portion arranged to face the top of the trench drain and projecting from the carrier wall to a distal end of the foot with an underside configured to engage the top of the drain, wherein the distal end is spaced from the carrier wall by a distance at least two times greater than a distance between outer surfaces of the front and rear walls.

In the illustrated arrangement, a peripheral edge of each of the distinct feet, which defines a footprint thereof, is rounded.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in conjunction with the accompanying drawings in which:

FIG. **1** is a perspective view of an arrangement of fluidic coupler according to the present invention;

FIG. **2** is a cross-sectional view of the arrangement of FIG. **1** as if it were taken along line **2-2** in FIG. **3** but showing the fluidic coupler arrangement in use in a trench drain, which is schematically illustrated;

FIG. **3** is a front elevational view of the arrangement of FIG. **1** shown externally of the trench drain (schematically shown and with double sinusoidal break lines indicating truncated length); and

FIG. **4** is a top plan view of the arrangement of FIG. **1**.

In the drawings like characters of reference indicate corresponding parts in the different figures.

DETAILED DESCRIPTION

The accompanying figures show a fluidic coupler, indicated at reference numeral **10**, for fluidically communicating a hose (not shown) with a trench drain **1** in a support surface SS, as more clearly shown in FIGS. **2** and **3**. For example, the hose is fluidically connected to an outlet of a liquid-containing vessel (not shown) to guide the liquid as it flows out of the vessel. This is a typical configuration in an alcoholic-beverage production facility, such as a brewery, distillery or winery, in which used liquid contained in a vessel is to be discharged therefrom, after a production cycle, and into a drain in a support surface defined by a floor which collects waste liquid.

Generally speaking, the trench drain **1** is in the form of a channel or trough **2** which is embedded in support material forming or defining the support surface SS and which extends longitudinally from one end **3**, which may be closed by wall **3**A, to a longitudinally opposite end **4** of the channel, which may be in fluidic communication with a collection basin B which, with the drain **1** collectively forms a drainage system. In the illustrated arrangement, the collection basin B, which is configured to collect liquid, is disposed beneath the support surface. For example, the support surface SS may be a floor, when the drain is provided indoors, or the ground when the drain is installed outdoors.

The channel **2** comprises a upper visible portion **6** which is exposed at the support surface SS to define a top surface **6**A of the channel, which in the illustrated arrangement is planar, and which is contiguous and preferably lies in a

common plane as the surrounding support surface SS which typically also is planar. The upper channel portion **6** forms a longitudinally elongated slot **7** at the top of the channel which is relatively narrow so as to prevent passage of debris other than liquid into the trench drain. The upper portion **6** forms a mouth and throat of the trench drain which is configured to admit liquid into a lower conduit portion **8** thereof, which is enlarged relative to the slot in a transverse (width-wise) direction and which is configured to convey the liquid by gravity to waste. Typically, the channel **2** extends along a linear path such that the slot is linear, being elongated in the longitudinal direction of the channel.

The upper and lower portions of the channel are basically in the form of longitudinally extending sidewalls, which taper downwardly and outwardly to form a relatively narrow top inlet and an enlarged lower conduit, and which converge at a base at a base of the channel which is opposite the slot. In the illustrated arrangement, the upper and lower portions of the drain are integrally formed such that the drain is unitary.

Turning now to the fluidic coupler **10**, this comprises front and rear walls **12**, **13** supported in upstanding generally-parallel spaced-apart condition. The front and rear walls **12**, **13** have upper portions **12**U, **13**U defining tops thereof indicated at **12**T, **13**T; lower portions **12**L, **13**L defining bottoms **12**B, **13**B thereof which are opposite to the tops **12**T, **13**T, and laterally opposite sides **12**S, **13**S spanning from the tops to the bottoms of the front and rear walls. In the illustrated arrangement, the front and rear walls **12**, **13** are planar so as to each extend linearly from top to bottom and side to side.

The lower portions **12**L, **13**L of the front and rear walls are configured for removable insertion into the trench drain **1** in a working configuration of the fluidic coupler, which is more clearly shown in FIGS. **2** and **3**, such that, in this configuration, the upper portions **12**U, **13**U of the front and rear walls are located externally of the trench drain. In the illustrated arrangement, the lower portions **12**L, **13**L are sized and shaped, primarily by spacing of the front and rear walls **12**, **13**, to be snugly inserted into the drain **1** through the slot **7** thereof, in a mating manner. In addition, since the drain slot **7** is linear, the lower portions **12**L, **13**L are configured for sliding movement along the channel.

Furthermore, the coupler **10** includes a pair of side walls **15** connected to the front and rear walls **12**, **13** in spaced-apart condition and spanning between the front and rear walls to define a cavity **17** therebetween. More specifically, in the illustrated arrangement, the side walls **15** are arranged in upstanding, generally parallel and laterally spaced-apart condition between the front and rear walls, and are located at the sides **12**S, **13**S of the front and rear walls, so as to maximize a size of the cavity.

There is also provided a top wall **19** at or adjacent the tops **12**T, **13**T of the front and rear walls to close the cavity **17** from the top of the coupler **10**. A handle **21** is attached to the top wall **19** and configured for gripping by a user to position the fluidic coupler in the working configuration.

Basically, the front, rear and side walls are a series of walls arranged to form a cavity, and thus the walls so connected form a container which is open at its bottom to an exterior environment of the fluidic coupler for gravitationally releasing liquid.

The fluidic coupler **10** further includes hose coupler **23** supported on the upper portion **12**U of the front wall in fluidic communication with the cavity **17**, and configured for fluidic coupling with the hose, so as to pass liquid from the hose to the cavity **17**. As more clearly shown in FIG. **2**, the liquid exiting the hose flows into the coupler in a generally normal direction of flow to the rear wall **13**. The rear wall **13** thus deflects the liquid which is pulled by gravity towards the bottom of the fluidic coupler.

To enable the liquid received from the hose to exit the coupler, the cavity **17** is open at the bottoms **12**B, **13**B of the front and rear walls for fluidic communication with the trench drain **1** in the working configuration so as to release the liquid received from the hose to the trench drain. Thus the cavity is substantially enclosed except for at the bottom of the coupler for discharge of the liquid to the drain. One or more structural spacer members **25** are provided in the cavity **17** at or adjacent the bottoms of the front and rear walls to interconnect the walls, such that the interior cavity **17** of the coupler is communicated with the trench drain through one or more openings formed in the bottom of the coupler between the spacer members **25** and the walls **12**, **13**.

To support the fluidic coupler **10** in the working configuration, the coupler **10** includes a plurality of feet **28** carried on the front and rear walls **12**, **13** at spaced heights above the bottoms thereof **12**B, **13**B and configured for resting on the top **6**A of the trench drain in the working configuration so as to support the hose coupler **23** above the trench drain **1**. Basically, the feet **28** define a depth of insertion of the coupler **10** into the drain and thus delimit the upper and lower portions of the front and rear walls.

The coupler feet **28** include a pair of distinct or separate feet carried on at least one of the front and rear walls **12**, **13** in laterally spaced-apart relation on either side of the hose coupler **23**. That is, the walls which are oriented to extend longitudinally of the trench drain are those which carry the feet. The feet act to stabilize a coupler body defining the cavity **17**, which is collectively formed by at least the front and rear walls **12**, **13** and the side walls **15**, against impact of liquid on the walls of the coupler as the liquid flows into and out of the cavity, which may induce fore-and-aft and side-to-side movement of the coupler **10**. It will be appreciated that the wall receiving the distinct feet may be referred to as a carrier wall for the feet for convenient reference.

In the illustrated arrangement, the coupler feet include a second pair of distinct feet carried on the other one of the front and rear walls, such that both the front and rear walls **12**, **13** which face outwardly and are located adjacent opposite sides of the upper channel portion **6**, for enhanced stabilization.

The pairs of distinct feet **28** are located at the sides the carrier wall so that they are arranged at maximally spaced apart positions on the wall. That is, the feet **28** are disposed at lateral terminuses of the front and rear walls **12**, **13**.

Each foot **28** comprises a proximal end **30**, relative to the carrier wall, which is at or adjacent the same, and which may be connected to the carrier wall so as to mount the foot thereto. The foot extends outwardly from the proximal end **30** in a transverse direction to the carrier wall to a distal end **31** thereof, which is spaced from the carrier wall.

At least one, and preferably each, of the distinct feet comprises a drain-engaging portion **33** arranged to face the top of the trench drain, defined by the top surface **6**A, and projecting from the carrier wall to the distal end **31** defined by the drain-engaging portion with an underside **35** configured to engage the top of the drain. In the illustrated arrangement, the drain-engaging portion **33** is planar so as to provide a planar underside for butting engagement with a planar top surface of the drain **1**.

Additionally, each distinct foot **28** comprises a bracing portion **37** thereof which is in fixed relation to the drain-engaging portion and provides an inner mounting surface for attaching to the carrier wall. In the illustrated arrangement, the bracing portion **37** is planar and arranged parallel to the carrier wall to provide a maximum sized mounting surface. Also, the bracing and drain-engaging portions **37**, **33** are integrally formed in the illustrated arrangement.

The distal end **31** of at least one, and preferably each, foot is spaced from the carrier wall by a distance at least two times greater than a distance between outer surfaces of the front and rear wall, which are positioned for engagement with an interior of the drain as shown in FIG. **2**.

At least one, and preferably each, of the distinct feet **28** has a cut-out **38** **37** in the distal end **31** thereof, which is opposite to the carrier wall, to form a plurality of toes **39**. The cut-out **38** extends partially inwardly, towards the carrier wall, less than half of a depth of the foot from the wall or proximal end **30** of the foot to the distal end **31** thereof.

In the illustrated arrangement, a peripheral edge **42** of each of the distinct feet, which defines a footprint thereof, is rounded. Thus, each toe is rounded and the cut-out **38** is concavely rounded.

As described hereinbefore, the present invention relates to a fluidic coupler for fluidically communicating a hose with a trench drain in a support surface, which comprises a series of walls arranged to form a cavity and arranged for insertion into the trench drain, and a hose coupler supported on one of the walls for fluidically connecting a hose so that liquid discharged therefrom is released into the cavity. The cavity is open at the bottom of the fluidic coupler so as to release the liquid to the trench drain. The fluidic coupler includes stabilizing feet supported on opposite walls which are parallel to sidewalls of the trench drain. The feet include a pair of distinct feet located at spaced positions on a carrying one of the opposite walls, and on either side of the hose coupler.

This arrangement provides a stably supported fluidic coupler for receiving liquid from a hose and guiding the same to the trench drain.

In use, the fluidic coupler **10** is manually inserted into the trench drain **1** with its bottom, defined by the lower portions **12**L, **13**L oriented downwardly and located in the slot **7** of the drain, so as to arrange the coupler **10** in the working configuration. As such, the fluidic coupler stands upwardly from the trench drain, and it is positioned with its bottom projecting into the channel **2** so that the coupler cavity **17** is positioned in communication with the drain at an inwardly spaced position from the slot **7** and top of the drain.

With a hose fluidically connected to the fluidic coupler **10** via the hose coupler **23**, liquid is discharged from the hose and into the coupler's cavity **17**, which gravitationally directs the liquid downwardly and into the trench drain. More generally speaking, liquid received from the hose is conveyed by the fluidic coupler to the drain.

The fluidic coupler is slidably repositionable along the length of the trench drain by sliding movement along the slot **7**.

The scope of the claims should not be limited by the preferred embodiments set forth in the examples but should be given the broadest interpretation consistent with the specification as a whole.

The invention claimed is:

1. A system for draining liquid from a vessel using a hose fluidically communicated therewith, the system comprising:

a trench drain in a support surface for receiving the liquid conveyed by the hose, wherein the trench drain comprises:

a channel arranged in a support material underlying the support surface, wherein the channel includes an upper portion defining a top of the trench drain arranged to be exposed at the support surface and a lower portion of the channel forming a base of the channel;

wherein the upper portion forms, at the top of the trench drain, a slot-shaped opening which is longitudinally elongated and defines an inlet for passage of the liquid into the trench drain;

wherein the lower portion has an interior which is enlarged in a transverse direction relative to the inlet; and

a fluidic coupler for fluidically communicating the hose with the trench drain, wherein the coupler comprises:

front and rear walls supported in upstanding generally-parallel spaced-apart condition, wherein the front and rear walls have upper portions defining tops thereof, lower portions defining bottoms thereof opposite to said tops, and laterally opposite sides spanning from the tops to the bottoms of the front and rear walls;

wherein the lower portions of the front and rear walls are removably inserted through the slot-shaped opening of the trench drain and into the channel thereof in a working configuration of the fluidic coupler such that, in the working configuration, the bottoms of the front and rear walls are in the channel, below the slot-shaped opening, and the upper portions of the front and rear walls are located externally of and above the trench drain;

a pair of side walls connected to the front and rear walls in spaced-apart condition and spanning between the front and rear walls to define a cavity therebetween;

a hose coupler supported on the upper portion of the front wall in fluidic communication with the cavity, and configured for fluidic coupling with the hose, so as to pass liquid from the hose to the cavity;

wherein the cavity is open at the bottoms of the front and rear walls for fluidic communication with the channel in the working configuration so as to release the liquid received from the hose to the trench drain; and

a plurality of feet carried on the front and rear walls at spaced heights above the bottoms thereof and configured for resting on the top of the upper portion of the trench drain in the working configuration so as to support the hose coupler above and outside the trench drain;

wherein the plurality of feet include a pair of distinct feet carried on one of the front and rear walls, defining a carrier wall, in laterally spaced-apart relation on either side of the hose coupler;

wherein the plurality of feet comprise drain-engaging portions arranged to face and engage the top of the trench drain and projecting from a respective one of the front and rear walls outwardly from the front and rear walls, wherein the drain-engaging portions are disposed above the bottoms of the front and rear walls; and

wherein the hose coupler is disposed above the plurality of feet.

2. The coupler of claim **1** wherein at least one of the pair of distinct feet has a cut-out in a distal end thereof, which is opposite to the carrier wall, to form a plurality of toes.

3. The coupler of claim **1** wherein the pair of distinct feet are located at the laterally opposite sides of the carrier wall.

4. The coupler of claim 1 wherein a distal end of at least one of the pair of distinct feet is spaced from the carrier wall by a distance at least two times greater than a distance between outer surfaces of the front and rear walls.

5. The system of claim 1 wherein a peripheral edge of each of the pair of distinct feet, which defines a footprint thereof, is rounded.

6. The system of claim 1 wherein the lower portions of the front and rear walls are removably slidably inserted into the trench drain such that the coupler is slidably movable along the slot-shaped opening in a longitudinal direction relative to the trench drain.

7. A coupler for fluidically communicating a hose with a trench drain in a support surface, the coupler comprising:

front and rear walls supported in upstanding generally-parallel spaced-apart condition, wherein the front and rear walls have upper portions defining tops thereof, lower portions defining bottoms thereof opposite to said tops, and laterally opposite sides spanning from the tops to the bottoms of the front and rear walls;

wherein the lower portions of the front and rear walls are configured for removable insertion into the trench drain in a working configuration of the fluidic coupler such that, in the working configuration, the upper portions of the front and rear walls are located externally of the trench drain;

a pair of side walls connected to the front and rear walls in spaced-apart condition and spanning between the front and rear walls to define a cavity therebetween;

a hose coupler supported on the upper portion of the front wall in fluidic communication with the cavity, and configured for fluidic coupling with the hose, so as to pass liquid from the hose to the cavity;

wherein the cavity is open at the bottoms of the front and rear walls for fluidic communication with the trench drain in the working configuration so as to release the liquid received from the hose to the trench drain; and

a plurality of feet carried on the front and rear walls at spaced heights above the bottoms thereof and configured for resting on a top of the trench drain in the working configuration so as to support the hose coupler above the trench drain;

wherein the plurality of feet include a pair of distinct feet carried on one of the front and rear walls, defining a carrier wall, in laterally spaced-apart relation on either side of the hose coupler;

wherein at least one of the pair of distinct feet has a cut-out in a distal end thereof, which is opposite to the carrier wall, to form a plurality of toes.

8. The coupler of claim 7 wherein the pair of distinct feet are located at the laterally opposite sides of the carrier wall.

9. The coupler of claim 7 wherein at least one of the pair of distinct feet comprises a drain-engaging portion arranged to face the top of the trench drain and projecting from the carrier wall to a distal end of said at least one of the pair of distinct feet with an underside configured to engage the top of the drain, wherein the distal end is spaced from the carrier wall by a distance at least two times greater than a distance between outer surfaces of the front and rear walls.

10. The coupler of claim 7 wherein a peripheral edge of each of the pair of distinct feet, which defines a footprint thereof, is rounded.

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